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B62K 15/00

(52) UK CL (Edition N )  
B7E ECF

(56) Documents Cited

GB 2260300 A GB 1250876 A GB 1054590 A  
GB 0415843 A US 5125678 A US 4022485 A

(58) Field of Search

UK CL (Edition N ) B7E ECF  
INT CL<sup>6</sup> B62K 15/00 25/00

(54) Folding bicycle

(57) A folding bicycle has a frame containing a clamped hinge 24 at or near the bottom bracket enabling the frame to be dismantled or folded compactly, a boss mounting for the handlebar stem, so that the handlebars may be easily detached and a front changer with extended pivots to provide clearance during folding. When connection 25 is released, and the rear wheel removed, the assembly 22, 23 can be pivoted about 24, after releasing the clamp. For more compactness, the seat tube 34 is curved.

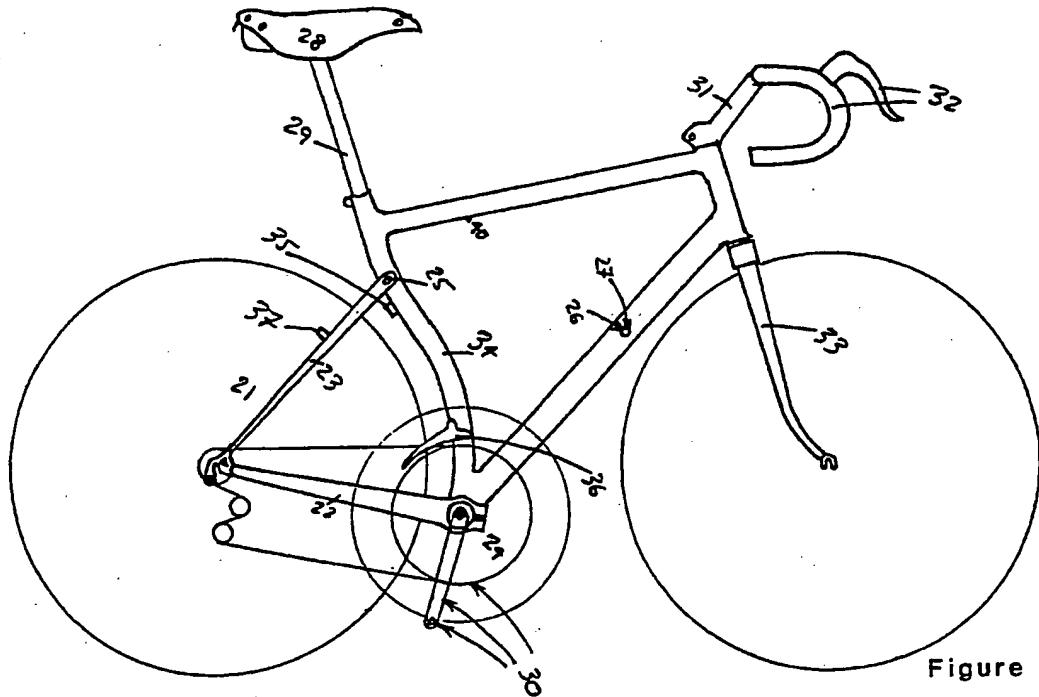


Figure 1

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Figure 1

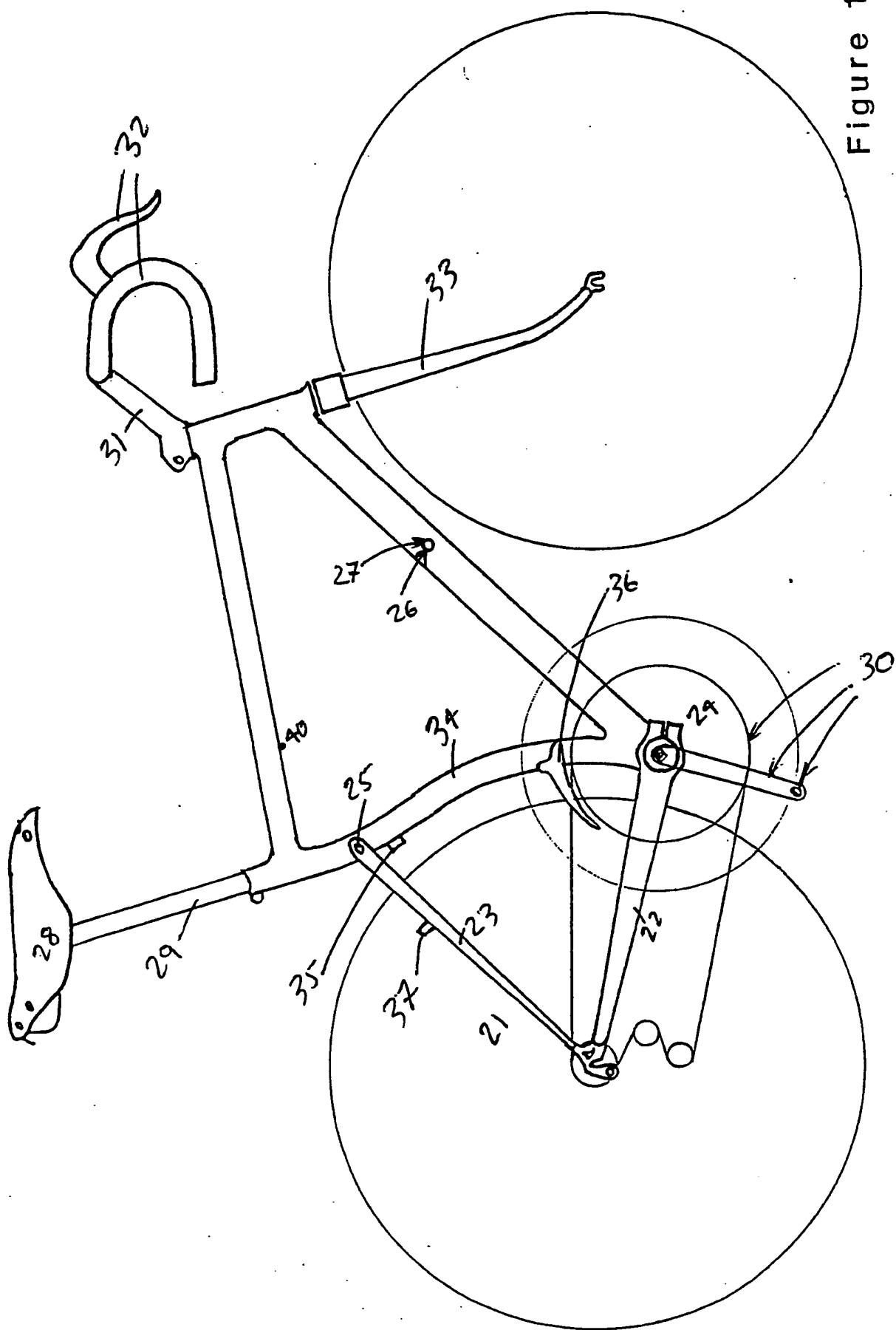
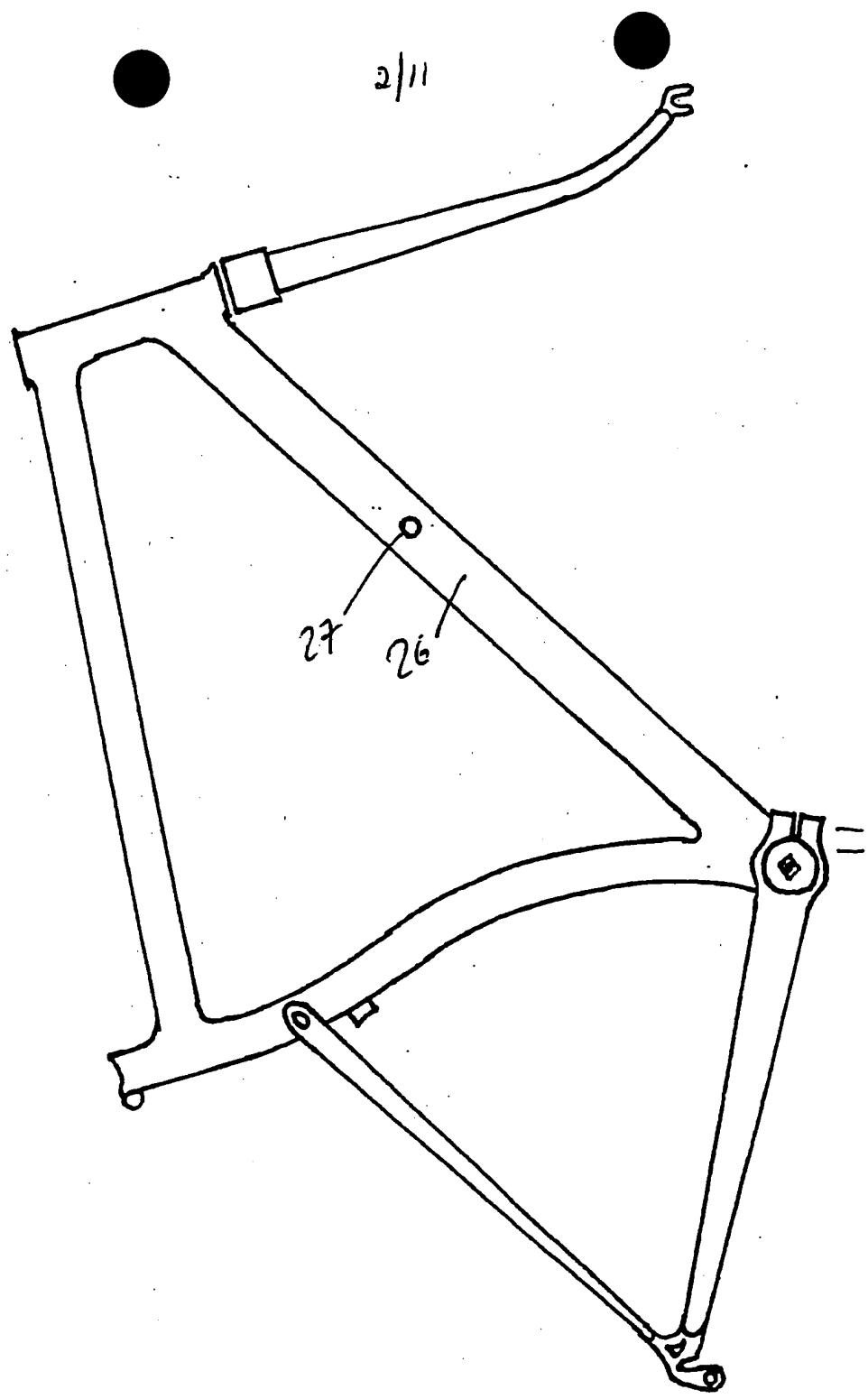


Figure 2



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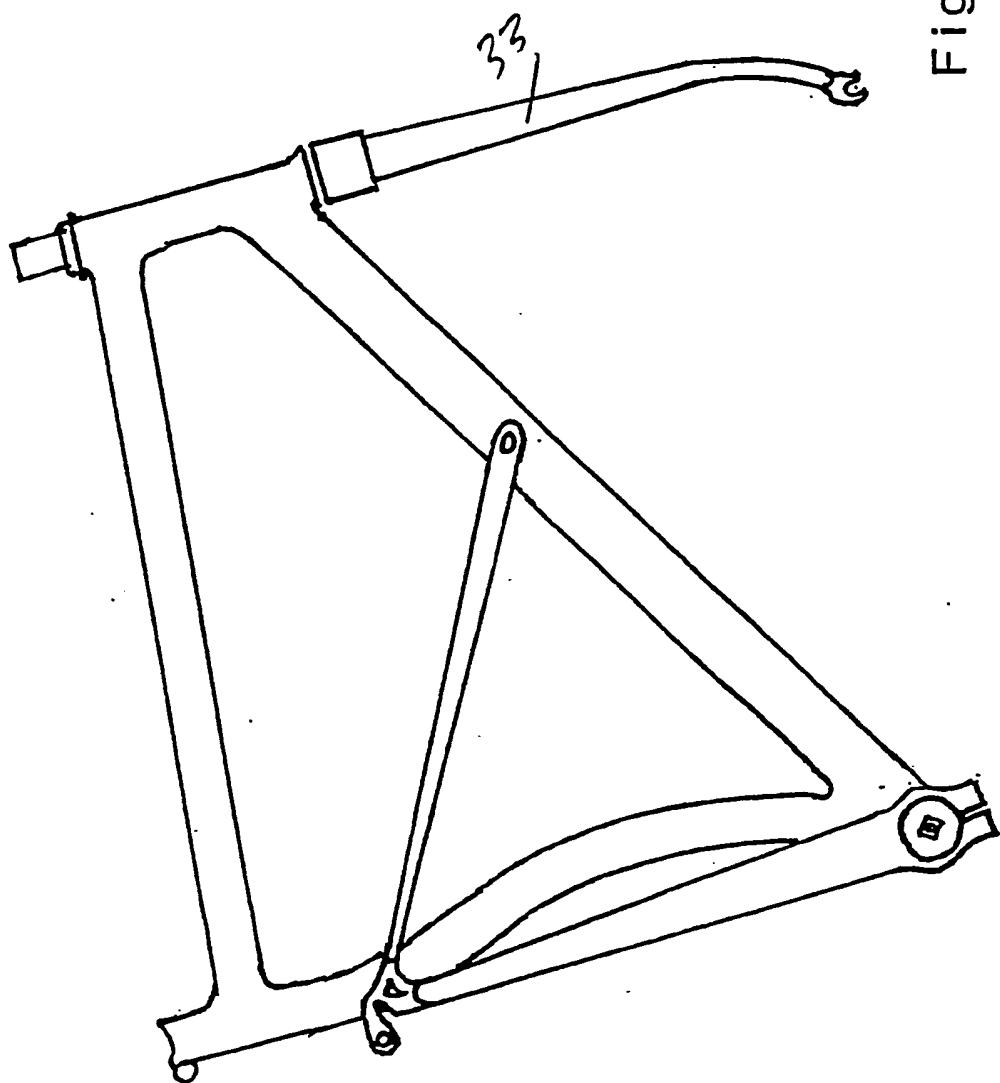
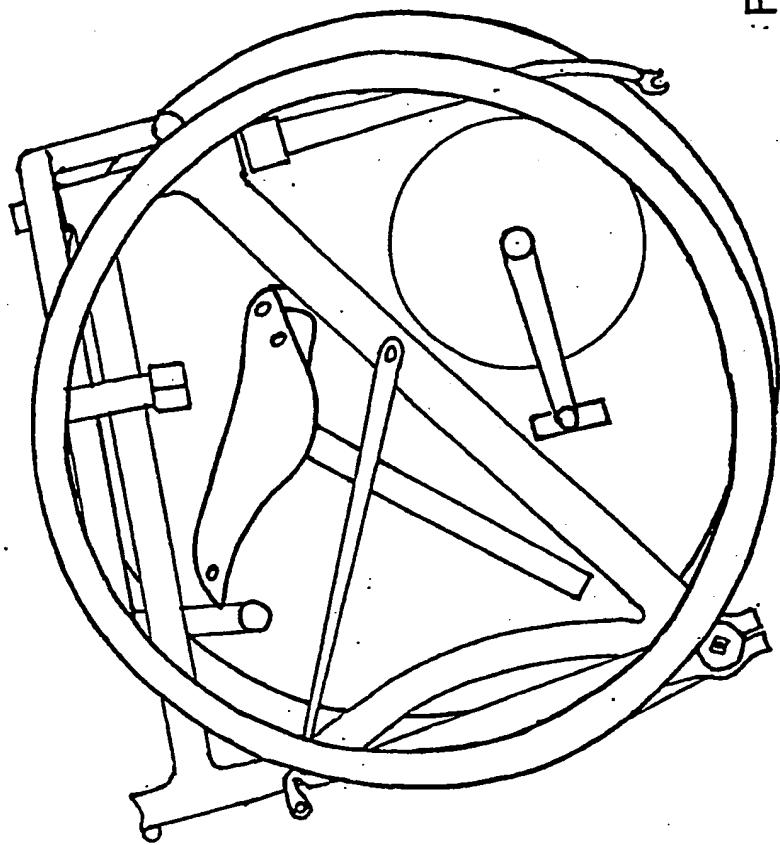


Figure 3

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Figure 4



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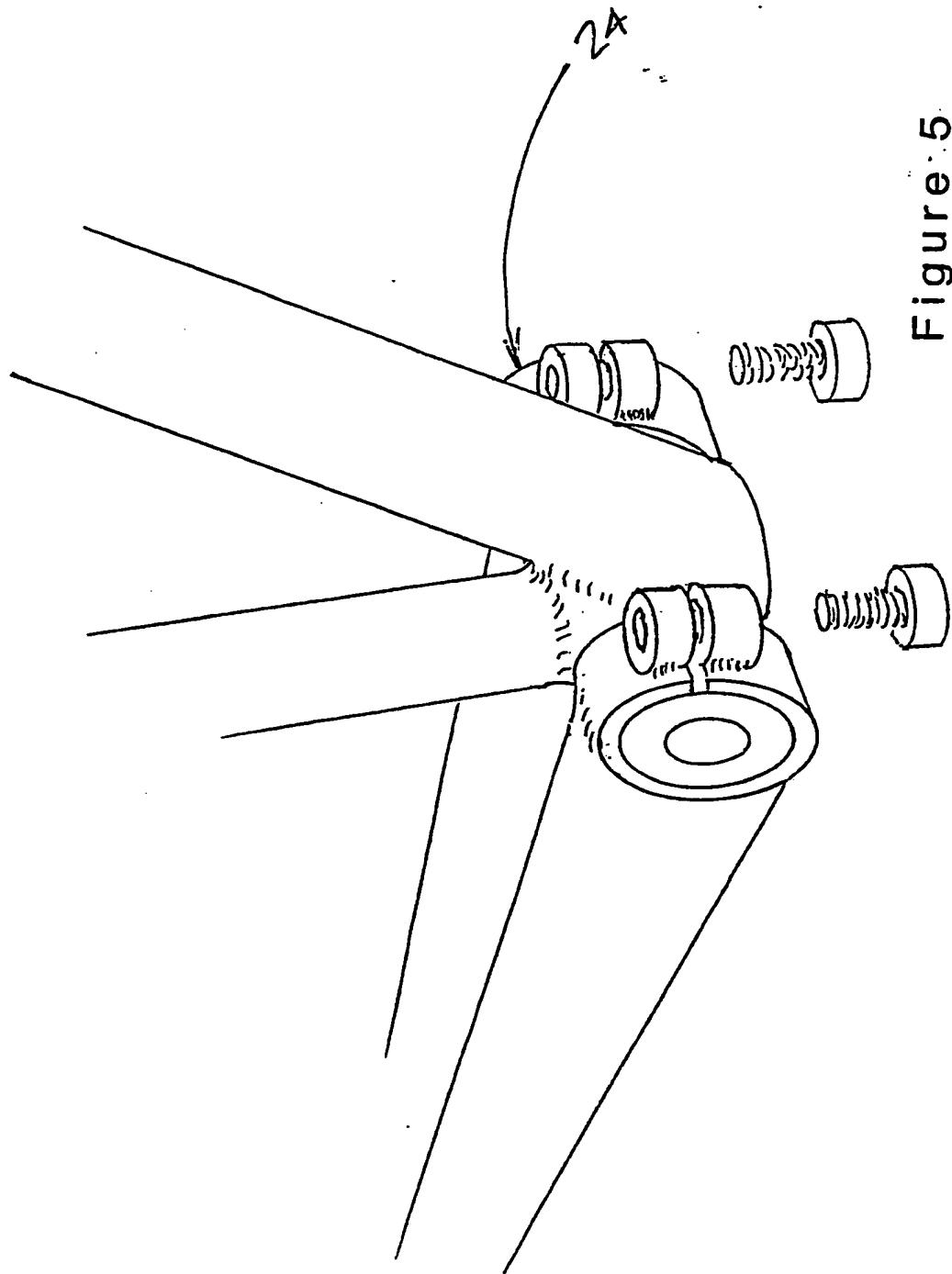


Figure 5

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Figure 6

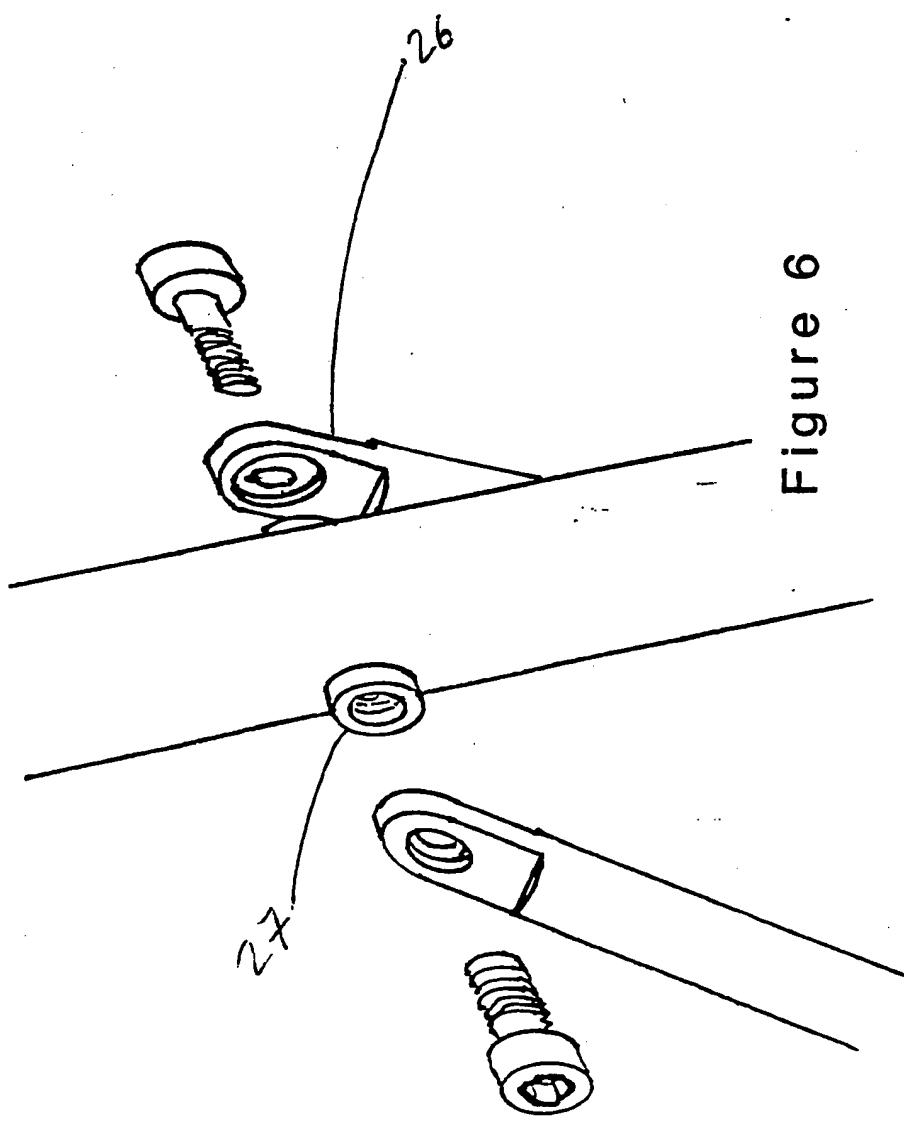


Figure 7

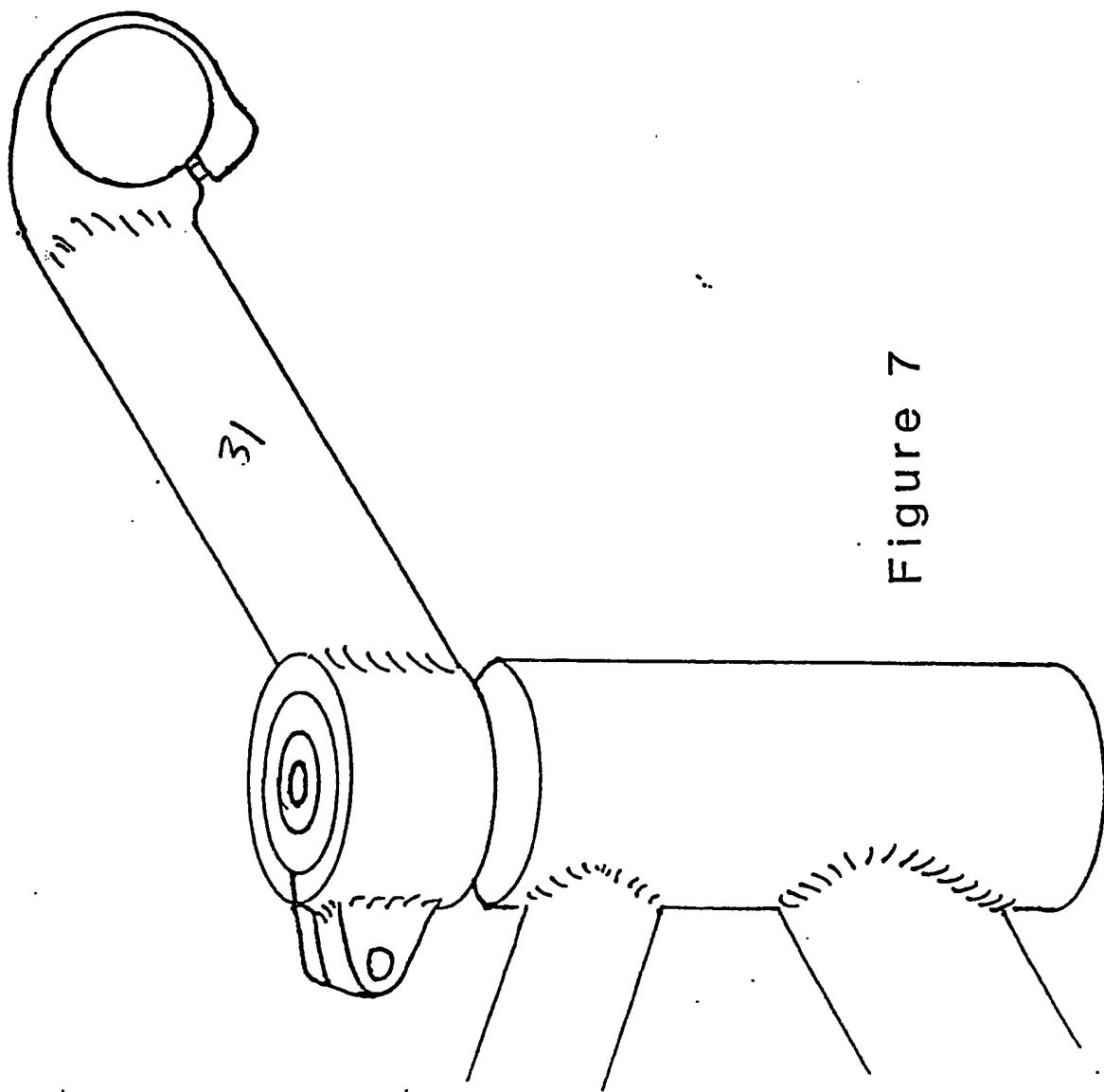
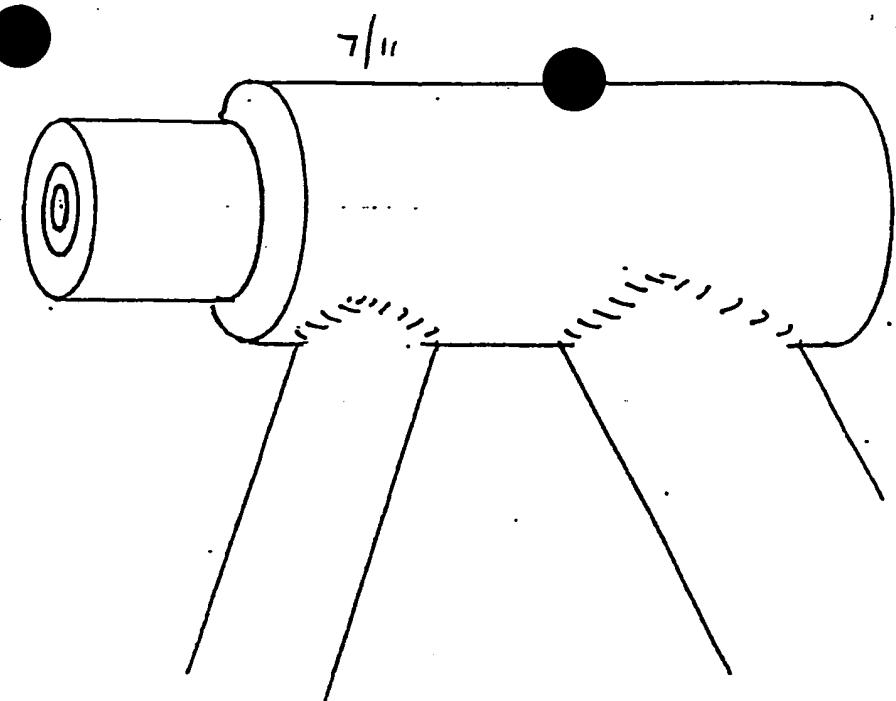


Figure 8



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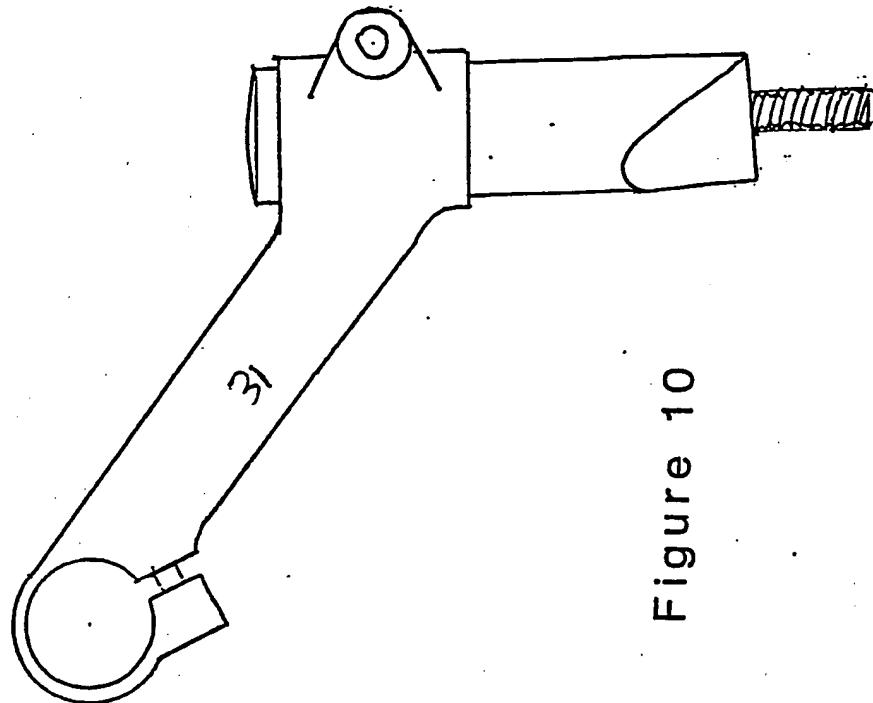


Figure 10

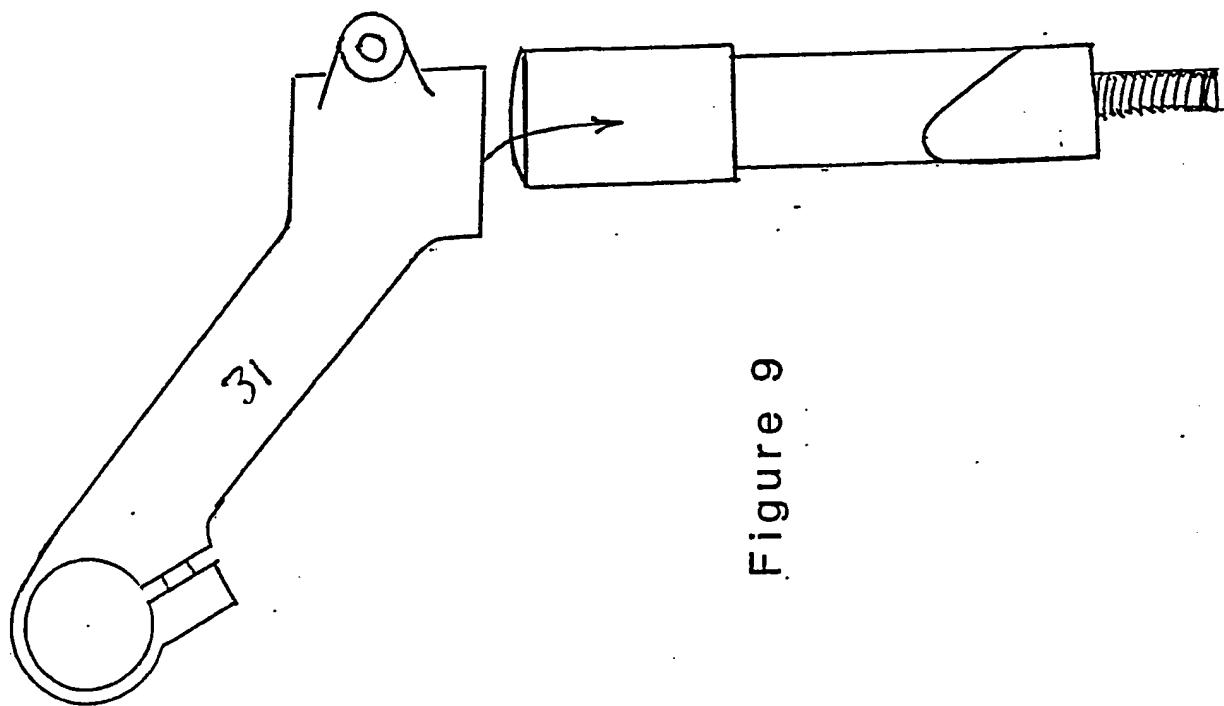


Figure 9

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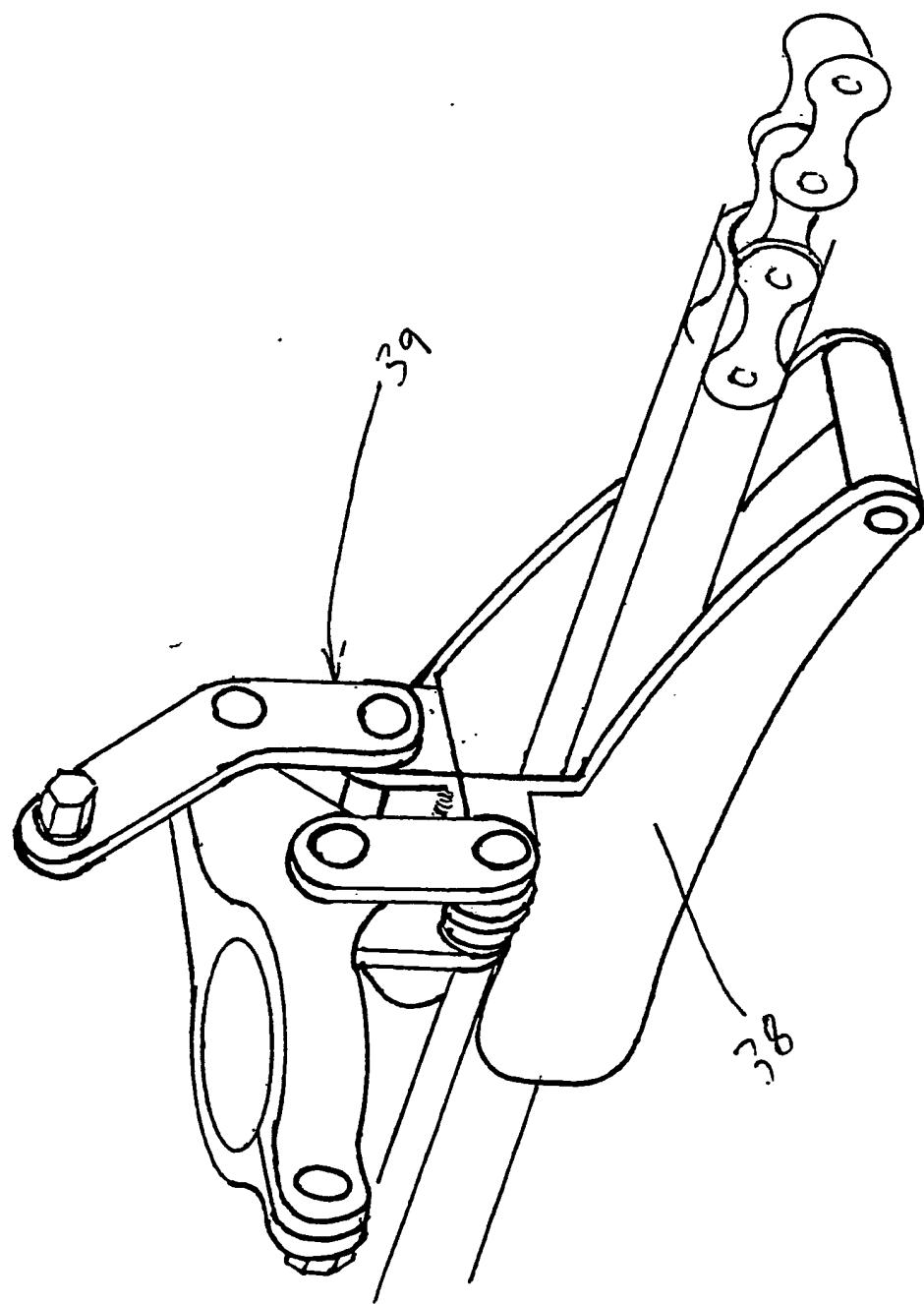


Figure 11

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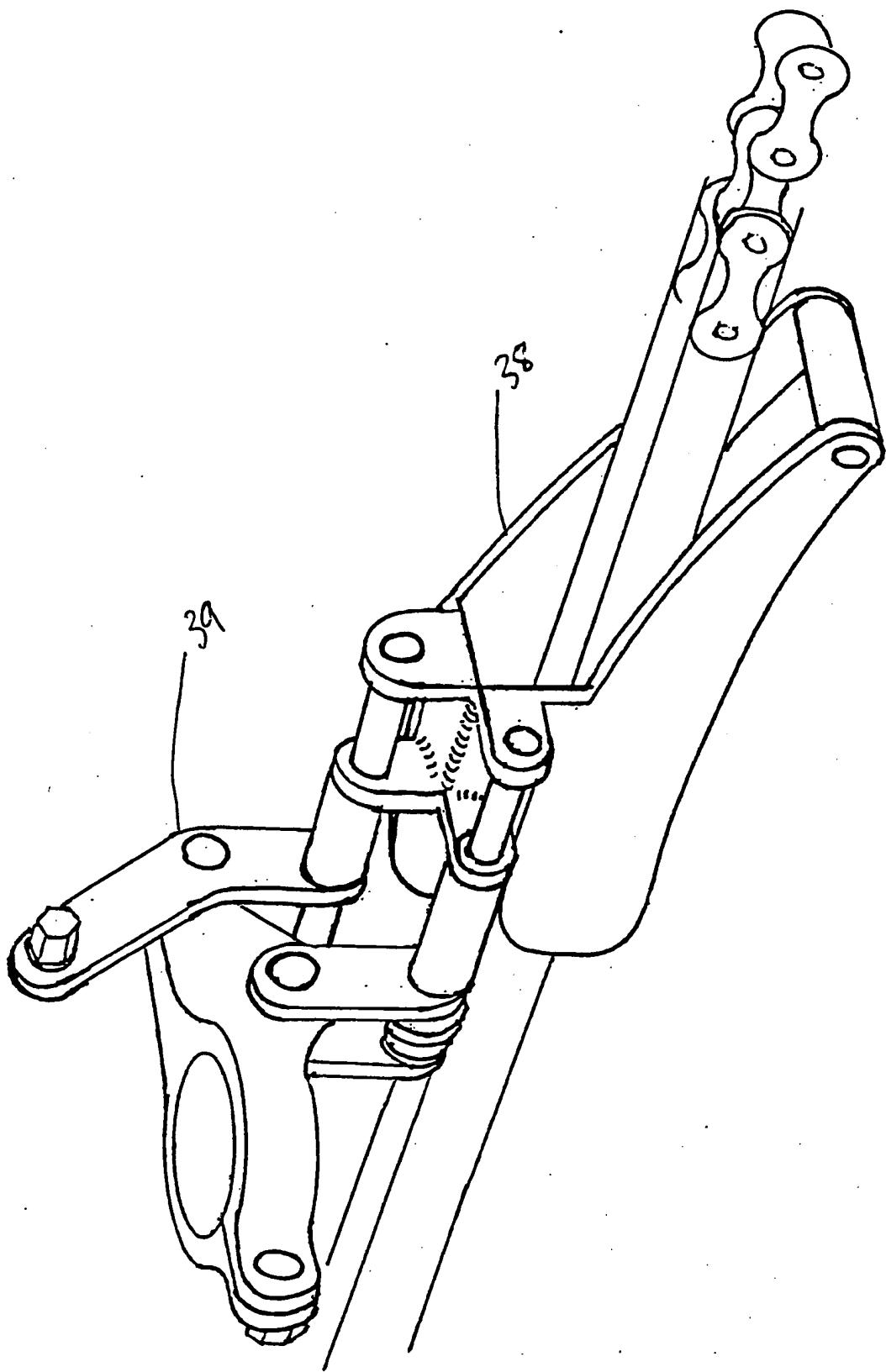


Figure 12

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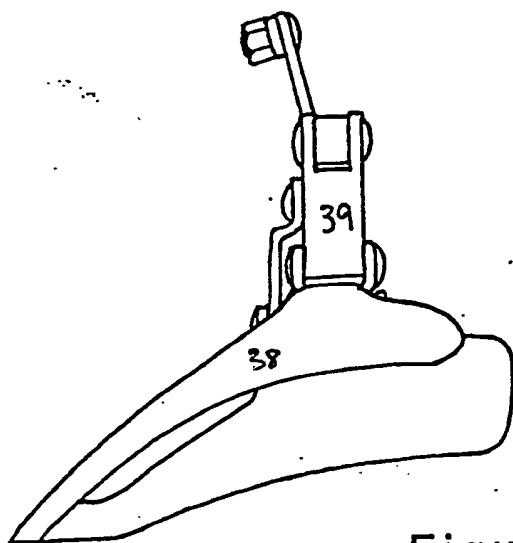


Figure 13

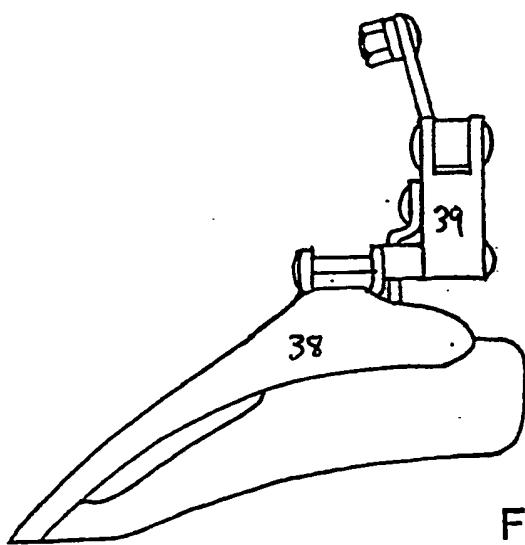


Figure 14

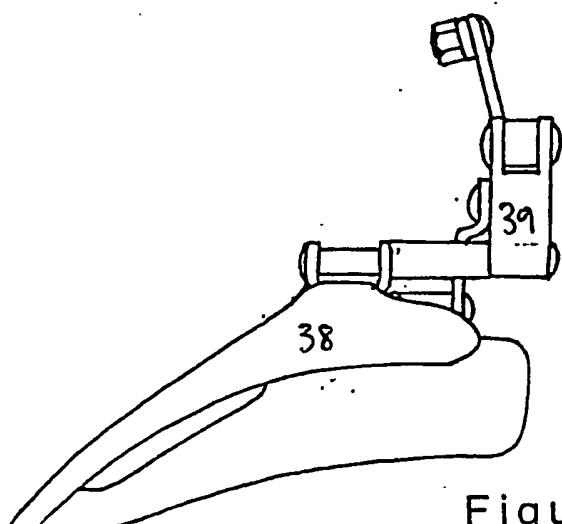


Figure 15

FOLD2

## FOLDING DISMANTLEABLE BICYCLE

This invention relates to a bicycle which can be dismantled and folded for compactness, carriage and storage.

Folding bicycles are readily available but are rarely lightweight orthodox double diamond frame designs with full size wheels. Almost all bicycles may be dismantled, though the process may be difficult and require special tools and skills.

Transport companies make few restrictions when conveying covered, collapsed bicycles as passengers' luggage, but often restrict uncovered and fully erected bicycles. Private car luggage spaces are usually too small for full size bicycles and either roof and boot racks are required to carry them or the bicycle must be dismantled extensively.

Left luggage facilities may refuse bicycles as an item but accept a more compact package containing one.

An enclosed, compactly packed bicycle may be more acceptably stored within a dwelling or inside at work for security.

According to the present invention there is provided a double diamond frame, whose rear triangle swings about an axis at or near the bottom bracket. The rear triangle in normal use is bolted to the seat tube.

The handlebars, which may be road cycle "drops" or mountain cycle "straights", are fitted to a stem usually found on the rear of a tandem bicycle called a "stoker-stem". This in turn is attached to a boss joined to the steerer tube in the normal fashion.

A specific embodiment of the invention will now be described by way of explaining the dismantling, folding and packing process, with reference to the accompanying drawings in which:

Figure 1 shows the bicycle in riding geometry  
Figure 2 shows the frame in riding geometry  
Figure 3 shows the frame folded  
Figure 4 shows the cycle packed  
Figure 5 shows detail at the bottom bracket  
Figure 6 shows detail at the seat and down tubes  
Figures 7 and 8 show detail at the head bearing  
Figure 9 and 10 show details of the stem  
Figures 11, 12, 13, 14 and 15 show details of the front changer

After the wheels have been removed, the rear triangle 21 (composed of chain stays 22 and seat stays 23) are unbolted, the hinge 24 loosened and the triangle swung up and forward so that the bolt holes 25 line up with the down tube 6. If required, they may be bolted to eyes 27 on the down tube and the hinge retightened. The saddle 28, seat post 29, cranks, chainring and pedals 30 may be removed by way of their orthodox fixings. The stoker stem 31, handlebars and brake-levers 32 are removed by way of its clamp bolt(s). The front fork 33 may be reversed for more compactness.

The bicycle now occupies a space little larger than its wheels, and little wider than two wheel widths.

To facilitate folding, a curved seat tube 34 may be employed, to which the rear brake via a boss 35 and a modified front-changer 36 may be fitted. Alternatively, cantilever brakes may be fitted to seat stay bosses 37. The front changer has its cage 38 moved backwards from the parallelogram 39 so that the chain-stays clear it when folded up, and also to maintain the correct geometry with the chainrings.

All bolts used in this design may be replaced by standard quick release bolts to minimise the use of tools and speed folding and disassembly.

If required, the hinges may be assembled loosely and a compression spring and damper used to attach the upper part of the rear triangle to the frame at 40 resulting in rear suspension.

To reassemble the bicycle, the steps described above are carried out in the reverse sequence.

CLAIMS

- 1 A folding bicycle whose frame hinges about an axis near and parallel to or colinear with the bottom bracket axle.
- 2 A folding bicycle of double diamond geometry
- 3 A folding bicycle whose weight, rigidity and performance is close to that of a touring or competition model
- 4 A folding bicycle whose handlebars are easily detached
- 5 A folding bicycle whose handlebars are attached via a boss and plug fitted into the steering column
- 6 A folding bicycle using orthodox wheels and components
- 7 A folding bicycle using a bent seat tube
- 8 A folding bicycle using a bent seat tube and extended front changer pivots
- 9 A folding bicycle using a bent seat tube to which the rear brake is directly or almost directly attached
- 10 A bicycle in which the folding action is combined with rear suspension

## Relevant Technical Fields

(i) UK Cl (Ed.N) B7E ECF

(ii) Int Cl (Ed.6) B62K 15/00, 25/00

Search Examiner  
MR R BROWNDate of completion of Search  
31 JANUARY 1995

## Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-  
1

(ii)

## Categories of documents

X: Document indicating lack of novelty or of inventive step.

P: Document published on or after the declared priority date but before the filing date of the present application.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

A: Document indicating technological background and/or state of the art.

&amp;: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2260300 A	(MOORE) whole document	1
X	GB 1250876	(SEARLE) whole document	1
X	GB 1054590	(SUMNER) whole document	1
X	GB 415843	(CAMILLIS) whole document	1
X	US 5125678	(BOGEN) whole document, see especially Figures 3 to 6	1
X	US 4022485	(COX) whole document, see especially Claims 1, 3 and 6	1

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).